EZT3E/F 'Easy Cal' CiTiceL®

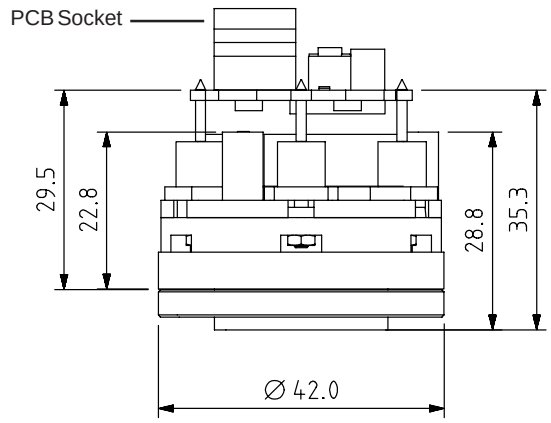
Low range 4-20mA Microprocessor Transmitter

Performance Characteristics

Sensor Type Used	3E/F
Inboard Filter	To remove H_2S and SO_2
Expected Operating Life	Three years in air
Resolution	0.5ppm
Temperature Range	-20°C to +50°C
Pressure Range	Atmospheric ± 10%
Pressure Coefficient	0.020 ± 0.008% signal/mBar
T_{90} Response Time	<30 seconds
Relative Humidity Range	15 to 90% non-condensing
Maximum Zero Shift (+20°C to +40°C)	9ppm equivalent
Long Term Output Drift	<5% signal loss/year
Repeatability	1% of signal
Output Linearity	Linear

N.B. All performance data is based on conditions at 20°C, 50%RH, and 1013mBar

Outline Dimensions



Ranges Available

3E/F CiTiceL 'Easy Cal' 4-20mA Transmitters are available with the following precalibrated ranges:

Range	Order Code
0-50ppm	2TB7E-1A
0-100ppm	2TB7F-1A
0-200ppm	2TB7G-1A
0-300ppm	2TB7H-1A
0-500ppm	2TB7I-1A

Electrical Properties

Minimum Input Span	5uA
Maximum Input Span	±100uA
Linearity @ 25°C	0.01% Full Scale
Thermal Drift (Input)	0.02% per °C
Linearisation	Linear Response
Output	4/20mA, 2 wire loop powered
Max Output Range	3.8 to 21mA
Operating Voltage	10 to 30VDC
Thermal Drift (Output)	2uA per °C
Output Accuracy	±5uA
Protection	Reverse Polarity Protected
Maximum Loop Load	$R_{LOAD} = (V_{supply}-10)*50$ eg 700Ω at 24V

Physical Characteristics

Weight	58g (incl. mounting accessory)
Position Sensitivity	None
Storage Life	Six months in CTL container
Recommended Storage Temperature	0-20°C
Warranty Period	12 months from date of despatch

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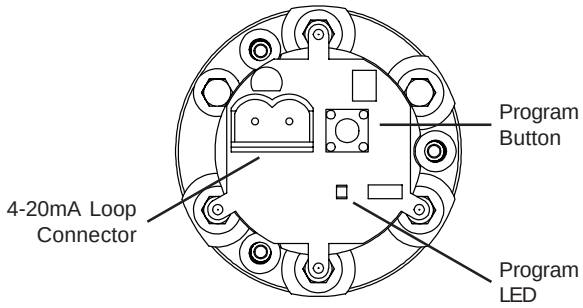
Carbon Monoxide 'Easy Cal' CiTiceL® Specification



Calibration notes

Recalibration is only possible if the output of the sensor at full scale is greater than 50% of the original factory calibration. Failure can occur if:

1. Attempts to recalibrate to a range less than 50% of the original factory calibrated range
2. The output of the sensor has fallen by more than 50% (replace sensor)
3. Incorrect span gas used (use correct span gas)
4. Insufficient time for output to settle after exposing sensor to span gas (apply span gas for 2-5 mins before setting 20mA level)

Transmitter Error Condition

Any time the error condition is set the output will be forced to 21mA and the LED will be held on. Carry out the Reset function to reset the error.

Reset to Factory Calibration

1. Remove loop power from transmitter.
2. Hold down push button and connect loop power to transmitter.
3. LED will blink as soon as power is applied (approx. 2Hz).
4. Transmitter output set to 21mA.
5. Releasing button will start an 8 second timout period.
6. After 8 seconds the factory calibration will overwrite user calibration.
7. LED cleares and transmitter goes back into normal mode.

User Calibration Method

(Span gas = 20mA signal)

1. Connect loop power to the transmitter.
2. Apply required zero gas/air to transmitter for 2 minutes.
3. Hold down button until LED flashes at approx. 1Hz. (4mA level now set)
4. Apply required span gas to transmitter for 2 to 5 minutes.
5. Press and release button (20mA level now set)
6. There will be an 8-second timeout period and flashing LED approx. 8Hz.
7. Calibration is complete, LED clears and returns to normal mode.

Non Standard Span Gas Calibration

(Span gas ±5% full range)

1. Calculate the mA signal expected for span gas.
   Example:
   Required 4-20mA range is 0-500ppm
   Available span gas is 480ppm
   Dynamic range is 16mA
   Therefore 1mA = 31.25ppm
   Expected signal at 480ppm = (15.36mA + 4mA) = 19.36mA
   Each time button is pressed signal increases by 40uA. When the output reaches 20.8mA the next button press will take the output to 19.2mA. Further button presses will again increase the output by 40uA.
   The output range availiable is 19.2mA to 20.8mA.
2. Carry out steps 1-4 of User Calibration Method
3. Press and release button to set 20mA level.
4. Continued momentary pressing of the button within an eight second period will trim the output by 40uA. When the required output is reached, allow the transmitter to timeout.
5. Calibration is complete, LED clears and returns to normal mode.

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Non Standard Span Gas Calibration

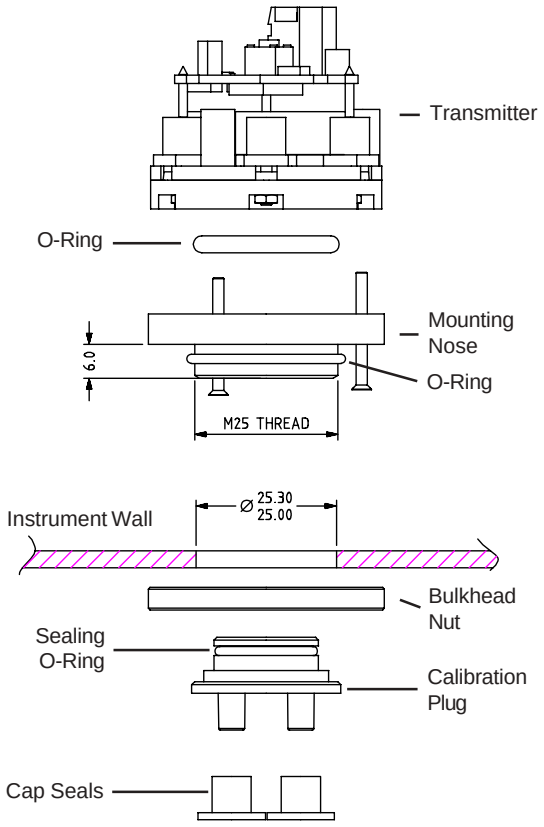
(Span gas not within ±5% of full range)
(current source required)

1. Measure the current of the sensor with a known gas concentration. This can then be used to calculate the µA/ppm for the specific sensor.
2. Now calculate the expected current when the sensor is exposed to the full scale of target gas.
   Example:
   Required 4-20mA range is 0-500ppm
   Available span gas is 300ppm
   Current from sensor when exposed to span gas = 33uA
   Therefore sensitivity = 0.11 uA/ppm
   Expected sensor output at 500ppm = 55uA
3. Connect current loop power to the transmitter.
4. Connect a current source to the transmitter.
   For oxidising sensors (CO, H_2S, SO_2, NO, ...) connect the negative to 'SEN' and positive to 'CNT'.
   For reducing sensors (Cl_2 or NO_2) connect the positive to 'SEN' and negative to 'CNT'.
   'CNT' and 'REF' terminals on the transmitter board should be connected.
5. Set the current source to zero.
6. Hold down button until LED flashes at approx. 1Hz. (4mA level now set in RAM)
7. Set the current source to the value calculated for the full scale of target gas.
8. Press and release button
   (20mA level now set into RAM)
9. There will be an 8-second timeout period and flashing LED approx. 8Hz.
10. Calibration is complete, LED clears and returns to normal mode.

Mounting

A diffusion mounting assembly, the "nose" adaptor, is supplied with CiTiceL transmitters for convenient mounting in a wide range of weatherproof housings. The nose adaptor requires a 25mm diameter hole in the outside wall of the housing to allow installation. The assembly is shown below.

The Mounting Nose also features a plug for easy zeroing and exposure to gas during calibration. A bonded membrane and mesh is included to prevent the ingress of dirt and dust particles to the CiTiceL.



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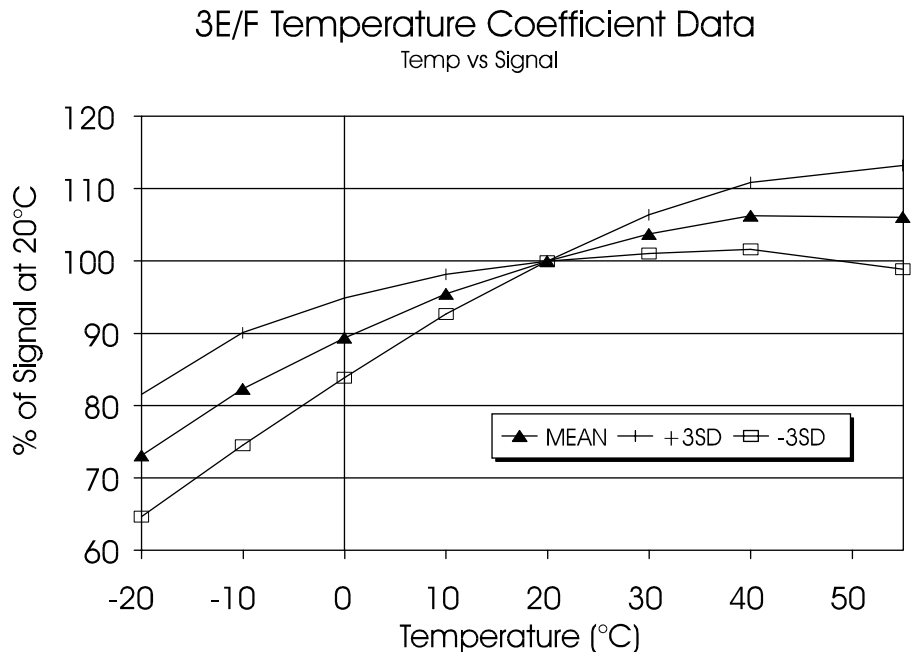
Temperature Dependence

The output of a CiTiceL can vary with temperature. The graph here shows the variation in output with temperature for 3E/F CiTiceLs based on a sample of about 16 sensors. The results are shown in the graph as a mean for the batch, and expressed as a percentage of the signal at 20°C.

From a statistical viewpoint, for a sample of this size, the range in values observed for all sensors of this type will fall within a range three times the standard deviation above or below the mean. Assuming therefore this sample is typical, then the temperature behaviour of all 3E/F CiTiceLs will fall in the band +3SD to -3SD.



Cross-sensitivity Data

CiTiceLs may exhibit a response to certain gases in a sample other than the target gas. 3E/F CiTiceLs have been tested with a number of commonly cross-interfering gases and the results expressed below as the typical response to be expected from a sensor when exposed to a given test gas concentration (relevant to safety, e.g. TLV levels).

Gas	Conc.	3E/F	Gas	Conc.	3E/F
Hydrogen sulphide:	15ppm	≈1ppm	**Sulphur dioxide:**	5ppm	0ppm
Nitric oxide:	35ppm	<3.5ppm	**Nitrogen dioxide:**	5ppm	0ppm
Chlorine:	1ppm	0ppm	**Hydrogen:**	100ppm	<60ppm
Hydrogen cyanide:	10ppm	0ppm	**Hydrogen chloride:**	5ppm	0ppm
Ethylene:	100ppm	<75ppm			

For details of other possible cross-interfering gases contact City Technology

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